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IS : 4864 - 1968
to
IS : 4870 - 1968
(Reaffirmed 2006)

Indian Standard

SPECIFICATION FOR SHELL FLANGES FOR VESSELS AND EQUIPMENT

(Sixth Reprint MAY 1993)

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

Gr 9 *October* 1969

Indian Standard
SPECIFICATIONS FOR SHELL FLANGES FOR VESSELS AND EQUIPMENT

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(*Continued on page* 40)

BUREAU OF INDIAN STANDARDS
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Indian Standard
SPECIFICATIONS FOR SHELL FLANGES FOR VESSELS AND EQUIPMENT

0. FOREWORD

0.1 These seven Indian Standard Specifications for Shell Flanges for Vessels and Equipment were adopted by the Indian Standards Institution on 3 September 1968, after the drafts finalized by the Chemical Engineering Sectional Committee had been approved by the Mechanical Engineering Division Council.

0.2 Shell flanges are differentiated from flanges in pipes in that the former are not subject to bending and other stresses due to piping connections to which later are subject. Flange connections between shell sections and between the shell and the head are in general practice in industry as bolted flange means are the easiest means of assembling and dismantling vessels and equipment.

0.3 This group of Indian Standard specifications for shell flanges for vessels and equipment comprises the following:

IS : 4864-1968	General requirements
IS : 4865-1968	Welded shell flanges for non-pressure service
IS : 4866-1968	Welded shell flanges for carbon steel pressure vessels and equipment
IS : 4867-1968	Welding neck shell flanges for carbon steel pressure vessels and equipment
IS : 4868-1968	Welded shell flanges for stainless steel pressure vessels and equipment
IS : 4869-1968	Welded shell flanges with hub for stainless steel pressure vessels and equipment
IS : 4870-1968	Flat gaskets for shell flanges

0.4 In the preparation of these standards assistance has been derived from the following standards:

DIN 28030 : 1967 Flanchverbind ungen für Behälter und Apparate (Shell flanges for vessels and equipment)

DIN 28031 : 1967 Schweissflansche für drucklose Behälter und Apparate aus unlegierten und nichtrostenden Stählen (Welded shell flanges for vessels and equipment of carbon and stainless steel not subject to pressure)

DIN 28032 : 1967 Schweissflansche für Druckbehälter und Apparate aus unlegierten Stählen (Welded flanges for pressure vessels and equipment in carbon steels)

DIN 28034 : 1967 Vorscheweissflansche für Druckbehälter und Apparate (Welding neck flange for pressure vessels and apparatus)

DIN 28036 : 1967 Schweissflansche für Druckbehälter und Apparate aus nichtrostenden Stählen (Welded flanges for stainless steel pressure vessels and apparatus)

DIN 28038 : 1967 Schweissflansche mit zylindrischem Ansatz für Druckbehälter und Apparate aus nichtrostenden Stählen (Welded flanges with hub for stainless steel pressure vessels and equipment)

DIN 28040 : 1967 Flachdichtungen für Apparate flanschverbindungen (Flat gaskets for shell flanges)

issued by the Deutscher Normenausschuss.

0.5 For the purpose of deciding whether a particular requirement of these standards is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in these standards.

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*Rules for rounding off numerical values (*revised*).

Indian Standard

SPECIFICATION FOR SHELL FLANGES FOR VESSELS AND EQUIPMENT : GENERAL REQUIREMENTS

1. SCOPE

1.1 This standard covers general requirements for shell flanges for vessels and equipment, and fully and clearly defines them by providing information supplementary to that given in the other standards in this series.

2. DEFINITIONS

2.0 For the purpose of this standard, the following definitions shall apply.

2.1 Maximum Working Pressure — The maximum gauge pressure at the coincident metal temperature that is permitted for the vessel in operation.

2.2 Maximum Working Temperature — The maximum working temperature of the contents of the vessel at the maximum pressure specified.

2.3 Stress Relief Heat Treatment — Uniform heating of the part to a sufficient temperature, below the critical range, to relieve the major portion of the residual stresses, followed by uniform cooling.

3. FASTENERS

3.1 The bolts and nuts shall comply with the requirements specified in Table 1 regarding the specifications to which they should conform and the finish required.

3.1.1 *Material* — Carbon steel with a guaranteed yield point of not less than 24 kgf/mm^2 at room temperature is quite adequate for fastener sizes up to M30 and maximum working temperatures up to 300°C. The C35 grade steel is quite suitable as material for the studs conforming to IS : 1862-1967*.

When service conditions require it, other materials may also be used subject to agreement between the user and the manufacturer.

4. FLANGE

4.1 Flange Selection — Flanges conforming to IS : 4865-1968 of this standard are suitable for non-pressure service for temperatures up to 200°C. Welded shell flanges conforming to IS : 4866-1968 and IS : 4868-1968 are

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*Specification for studs (*first revision*).

for moderate service conditions of temperature and pressure. Welded neck flanges conforming to IS : 4867-1968 are to be preferred for more severe working conditions. Welded flanges conforming to IS : 4868-1968 and IS : 4869-1968 could replace the welded neck flanges. However, for temperatures above 200°C, the temperature differential across the flange has to be taken into account. It is recommended that the material chosen for the flange should have a coefficient of thermal expansion as near as possible to that of the material of the shell.

TABLE 1 REQUIREMENT FOR FASTENERS

(*Clause* 3.1)

SERVICE		BOLT	MATERIAL	NUT	MATERIAL
		Applicable Specification and Grade	Property Class According to IS : 1367-1967* or to Designation According to IS : 1762-1961†	Applicable Specification and Grade	Property Class According to IS : 1367-1967* or to Designation According to IS : 1762-1961†
With no internal pressure		IS : 1363-1967‡	4·6	IS : 1363-1967‡	4·6
UNDER EXTERNAL PRESSURE	Maximum working temperature not greater than 300°C	IS : 1364-1967§ Grade P	4·6 6·6	IS : 1364-1967§ Grade S	4·6
		IS : 1862-1967‖ Grade P	C 35	IS : 1862-1967‖ Grade S	St 50
	Maximum working temperature up to 400°C	IS : 1862-1967‖ Grade P	C 35 Alloy Steel	IS : 1862-1967‖	St 50 C 35 Alloy Steel

*Technical supply conditions for threaded fasteners (*first revision*).

†Code for designation of steel.

‡Specification for black hexagon bolts, nuts and lock nuts (dia 6 to 39 mm) and black hexagon screws (dia 6 to 24 mm) (*first revision*).

§Specification for precision and semi-precision bolts, screws, nuts and lock nuts (dia 6 to 39 mm) (*first revision*).

‖Specification for studs (*first revision*).

4.2 Material — The material of the flange shall be material conforming to the requirements of Table 2 or material equivalent or superior to this material at the temperature considered.

TABLE 2 MATERIALS OF CONSTRUCTION OF FLANGES

FLANGE SPECIFICATION	MATERIAL SPECIFICATION	
	From 0° to 300°C	From 300° to 400°C
Welded flange to IS : 4865-1968	IS : 2062-1962*	
Welded flange to IS : 4866-1968	IS : 2062-1962* Grades 1 and 2A of IS : 2002-1962† Grade 1 of IS : 1875-1966‡	Grade 2 of IS : 1875-1966‡ Grade 2A of IS : 2002-1962† or Steel to designation C15Mn75 of IS : 1570-1961§
Welding neck flanges to IS : 4867-1968	IS : 2062-1962* Grades 1 and 2A of IS : 2002-1962† Grade 1 of IS : 1875-1966‡	
Welded flanges to IS : 4868-1968 and IS : 4869-1968	IS : 2062-1962* Grades 1 and 2A of IS : 2002-1962† Stainless steels to designation 04Cr19Ni9Ti$\underline{20}$ 04Cr19Ni9Ni$\underline{40}$ 07Cr19Ni9Me2Ti$\underline{28}$ or 05Cr19Ni11Me3Ti$\underline{20}$ of IS : 1570-1961§ Grade 1 of IS : 1875-1966‡	

*Specification for structural steel (fusion welding quality). (Since revised).

†Specification for steel plates for boilers.

‡Specification for carbon steel billets, blooms and slabs for forgings (*revised*).

§Schedules for wrought steels for general engineering purposes.

4.3 Method of Manufacture — The flanges shall be of the ring or welding neck type and may be cut from plate, formed from bar, forged or fabricated by welding.

4.3.1 When the flanges are fabricated from sheet or plate material, strips are to be cut in the direction of rolling and bent. However, in the case of flanges for non-pressure vessels, the flange may be cut in the circular form directly from the sheet.

4.3.2 *Heat Treatment*—When the flange material has been hot forged or rolled in an unsuitable temperature range it shall be stress relieved. If the vessel thickness and composition require the welded joint between the flange and the shell to be heat-treated, it shall be carried out in accordance with the requirements of IS : 2825-1969*.

4.4 Dimensions — The dimensions of the flanges, the grooving dimensions, the number and size of the bolts shall be in accordance with the requirements of the applicable standard in this series.

The dimensions which have been specified in IS : 2825-1969* are based on the series of nominal diameters included in IS : 2844-1964†.

4.5 Supply — The flanges conforming to IS : 4866-1968, IS : 4867-1968, IS : 4868-1968 and IS : 4869-1968 may be supplied in any one of the following conditions:

a) **A** Unmachined,

b) **B** Machined, and

c) **C** Machined and drilled

and with full gasket area with no raised or recessed portion (**W**) or with any of the following forms of grooving:

a) Male and female (**M/F**) or

b) Tongue and groove (**T/G**)

4.5.1 If these flanges are ordered in the unmachined condition **A**, the machining allowance provided is adequate for the types **W**, **G** and **F**, whereas in the case of **M** and **T** types an extra thickness of 6 mm is to be provided over the required flange ring thickness. In the latter case, it should be specified in the order. If the operating pressure is much less than the maximum allowable working pressure specified, additional machining allowance need not be provided.

4.5.2 When flanges are supplied in the machined condition **C**, in the case of welded flanges the sealing surfaces shall be worked only after completion of the welding, whereas in the case of welding neck flanges the sealing surfaces could be even worked before welding.

5. GASKETS

5.1 Requirement of maintaining tightness in the assembled condition in the vessel and also when the vessel is under service require that the mean diameter of the gasket ring as well as the gasket width is as small as possible.

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*Code for unfired pressure vessels.

†Recommendation on nominal diameters for process equipment.

Taking the above factors into consideration, the dimensions of the gaskets have been so specified in IS : 4870-1968 that for a given inner diameter of the flange and for a given size of the bolt, the dimensions of the gaskets are given.

5.2 The type of the gasket and the design of the sealing surface shall be in accordance with the requirements of Table 3.

TABLE 3 REQUIREMENTS OF GASKETS

FLANGES CONFORMING TO	FINISH OF THE SEALING SURFACE (*see* IS : 3073-1967*)	GASKET
IS : 4865-1968	Smooth, ~ or ∇	Flat gasket ring FB conforming to IS : 4870-1968 or the full gasket over the entire gasket area
IS : 4866-1968 IS : 4867-1968 IS : 4868-1968 IS : 4869-1968	Smooth, ~ ∇†	Flat gasket ring FB conforming to IS : 4870-1968
	or	
	Male & female ∇∇ Tongue & groove ∇∇	Flat gasket FS type conforming to IS : 4870-1968

*Assessment of surface roughness.

†In case of metal jacketed gaskets, the surface finish required is ∇∇.

5.3 The gasket material and type shall be such that the gasket during assembling is not crushed and the strength level under service conditions is adequate. Compressed asbestos fibre jointing, metal and metal jacketed gaskets are normally adequate. If the service conditions are not severe soft gaskets like rubber and asbestos gaskets may be used.

6. USE OF MATERIALS

6.1 Other materials which are equivalent in performance under the conditions of service to those specified in this standard should be used subject to agreement between the purchaser and the supplier.

Indian Standard

SPECIFICATION FOR SHELL FLANGES FOR VESSELS AND EQUIPMENT: WELDED SHELL FLANGES FOR NON-PRESSURE SERVICE

1. SCOPE

1.1 This standard specifies the requirements for welded shell flanges for carbon steel and stainless steel vessels and equipment not subject to pressure.

2. DIMENSIONS

2.1 The dimensions for welded shell flanges, the diameter and number of bolts, vessel thickness and weight shall be as given in Table 1.

3. MATERIAL

3.1 Flange — The material of the shell flanges shall conform to the requirements specified in IS : 4864-1968.

3.2 Bolts and Nuts — The bolts and nuts shall conform to the requirements specified in IS : 4864-1968.

3.3 Gaskets — With these flanges, gaskets of type **FB** conforming to the requirements specified in IS : 4870-1968 shall be used.

4. DESIGNATION

4.1 Welded flange shall be designated by the machining condition in which supplied, nominal diameter, thickness (*h*) and number of this standard.

Example:

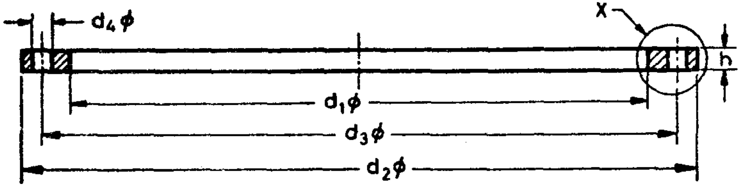
A welded flange supplied in machining condition **B**, having a nominal diameter 1 000 mm and thickness $h = 20$ mm shall be designated as:

Welded Flange **B** 1 000 × 20 IS : 4865-1968

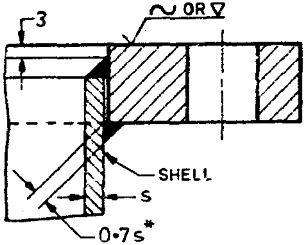
TABLE 1 DIMENSIONS FOR WELDED SHELL FLANGES

(*Clause* 2.1)

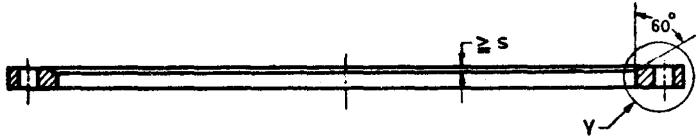
All dimensions in millimetres.



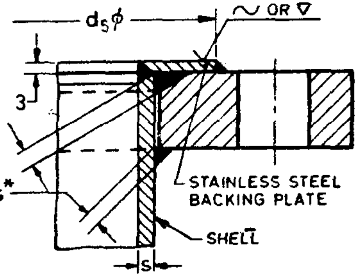
TYPE A FOR CARBON STEEL SHELL



ENLARGED DETAIL AT X



TYPE B FOR STAINLESS STEEL SHELL



ENLARGED DETAIL AT Y

*3·5 MIN

TABLE 1 — *Contd*

NOMINAL DIAMETER	FLANGE					BOLT			VESSEL THICKNESS s†, *Min*		WEIGHT OF A SINGLE FLANGE kg APPROX
	d_1	h	d_2	d_3	d_5 Approx	Number	Thread Nominal Dia	d_4	Carbon Steel	Stainless Steel	
324	326	20	415	375	345	12	M 16	18	5	4	7·9
368	370	20	460	420	390	16	M 16	18	5	4	8·7
419	421	20	510	470	440	16	M 16	18	5	4	9·7
(457)	459	20	550	510	480	20	M 16	18	5	4	10·6
508	510	20	600	560	530	20	M 16	18	5	4	11·5
600	602	20	700	660	630	24	M 16	18	5	4	14·8
700	702	20	800	760	730	28	M 16	18	5	4	17
800	802	20	900	860	830	32	M 16	18	5	4	19·3
900	902	20	1 000	960	930	36	M 16	18	5	4	21·6
1 000	1 002	20	1 100	1 060	1 030	40	M 16	18	5	4	23·8
1 100	1 102	20	1 200	1 160	1 130	44	M 16	18	6	5	26
1 200	1 202	25	1 320	1 270	1 240	48	M 16	18	6	5	43·4
(1 300)	1 303	25	1 420	1 370	1 340	48	M 16	18	6	5	47
1 400	1 403	25	1 520	1 470	1 440	48	M 16	18	6	5	50·4
(1 500)	1 503	25	1 620	1 570	1 540	52	M 16	18	6	5	53·8
1 600	1 603	25	1 720	1 670	1 640	56	M 16	18	6	5	57·2
(1 700)	1 703	25	1 820	1 770	1 740	56	M 16	18	6	5	60·6
1 800	1 803	30	1 920	1 870	1 840	56	M 20	22	8	6	75·5
(1 900)	1 903	30	2 020	1 970	1 940	60	M 20	22	8	6	79
2 000	2 003	30	2 120	2 070	2 040	64	M 20	22	8	6	82·9
(2 100)	2 103	30	2 220	2 170	2 140	68	M 20	22	8	6	87·4

NOTE — Sizes shown in parentheses are of second preference.

†s is normal thickness of shell. If higher or smaller thickness is desired, it shall be mentioned in the order.

(*Continued*)

TABLE 1 DIMENSIONS FOR WELDED SHELL FLANGES — *Contd*

All dimensions in millimetres.

NOMINAL DIAMETER	FLANGE					BOLT			VESSEL THICKNESS *s*†, *Min*		WEIGHT OF A SINGLE FLANGE kg APPROX
	d_1	h	d_2	d_3	d_5 Approx	Number	Thread Nominal Dia	d_4	Carbon Steel	Stainless Steel	
2 200	2 203	30	2 320	2 270	2 240	72	M 20	22	8	6	91·1
(2 300)	2 303	30	2 420	2 370	2 340	72	M 20	22	8	6	96
2 400	2 403	30	2 520	2 475	2 445	72	M 20	22	8	6	101
2 600	2 603	30	2 720	2 675	2 645	80	M 20	22	8	6	109
2 800	2 803	30	2 920	2 875	2 845	88	M 20	22	8	6	116
3 000	3 003	30	3 120	3 075	3 045	96	M 20	22	8	6	123
3 200	3 203	30	3 320	3 275	3 245	96	M 20	22	8	6	132
(3 400)	3 403	40	3 540	3 490	3 460	104	M 20	22	8	6	222
3 600	3 603	40	3 740	3 690	3 660	112	M 20	22	8	6	233
3 800	3 803	40	3 940	3 890	3 860	112	M 20	22	8	6	247
4 000	4 003	40	4 140	4 090	4 060	120	M 20	22	8	6	260

NOTE — Sizes shown in parentheses are of second preference.

†*s* is normal thickness of shell. If higher or smaller thickness is desired, it shall be mentioned in the order.

Indian Standard

SPECIFICATION FOR SHELL FLANGES FOR VESSELS AND EQUIPMENT : WELDED SHELL FLANGES FOR CARBON STEEL PRESSURE VESSELS AND EQUIPMENT

1. SCOPE

1.1 This standard specifies the requirements for welded shell flanges for carbon steel pressure vessels and equipment.

2. DIMENSIONS

2.1 The dimensions for welded shell flanges, the diameter and number of bolts, vessel thickness and weight shall be as given in Table 1.

3. MATERIAL

3.1 Flange — The material of the shell flanges shall conform to the requirements specified in IS : 4864-1968.

3.2 Bolts and Nuts — Bolts and nuts shall conform to the requirements specified in IS : 4864-1968.

3.3 Gaskets — Gaskets of type **FB** for flanges form **W** and type **FS** for flanges form **M/F** and **T/G** conforming to the requirements specified in IS : 4870-1968 shall be used.

4. DESIGNATION

4.1 The welded flange shall be designated by the machining condition and groove form in which supplied, nominal diameter, flange thickness (*h*) and number of this standard.

Example:

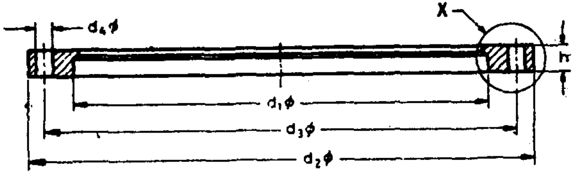
A welded flange supplied in machining condition **B** with groove form **T** having a nominal diameter 600 mm and flange thickness $h = 35$ mm shall be designated as:

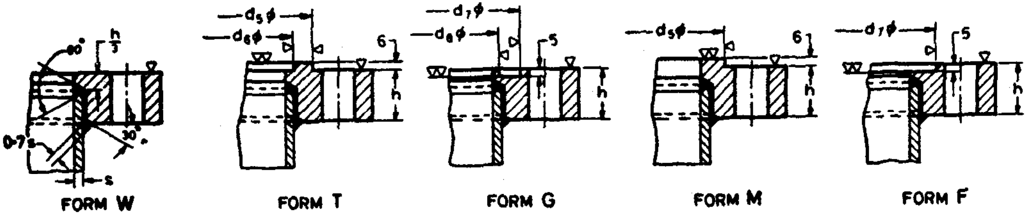
Welded Flange **BT** 600 × 35 **IS : 4866-1968**

TABLE 1 DIMENSIONS FOR WELDED SHELL FLANGES FOR CARBON STEEL PRESSURE VESSELS AND EQUIPMENT

(*Clause* 2.1)

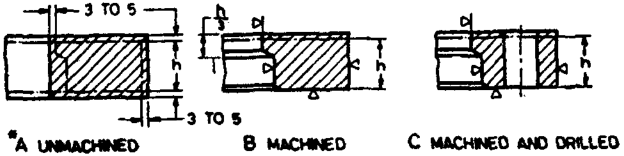
All dimensions in millimetres.





FORM W FORM T FORM G FORM M FORM F

DETAILS AT X (SHOWN WITH SHELL)



*A UNMACHINED B MACHINED C MACHINED AND DRILLED

MACHINING CONDITIONS

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*The machining allowance shall be so selected that the desired profile may be achieved without difficulty. The values given are adequate in case of **W**, **G** and **F** forms. In case of **T** and **M** forms, it shall be suitably increased.

TABLE 1 — *Contd*

NOMINAL DIAMETER	FLANGE				BOLTS			VESSEL THICKNESS *s* † *Min*	GROOVE FORM				WEIGHT OF A SINGLE FLANGE kg APPROX	MAXIMUM ALLOWABLE PRESSURE IN kgf/cm² AT THE MAXIMUM WORKING TEMPERATURE IN °C				
	d_1	h	d_2	d_3	Number	Thread Nominal Dia	d_4		T & M		G & F							
									d_5	d_6	d_7	d_8		20	120	200	250	300
324	326	25	415	375	12	M 16	18	6	344	324	346	322	10·1	8	7·2	6·4	5·6	4·8
		30	430	385		M 20	22	6	344	324	346	322	13·9	13	11	10	9	8
		40	445	395		M 24	26	6	350	324	352	322	21·2	25	22	20	17	15
368	370	25	460	420	16	M 16	18	6	338	368	390	366	11·2	8	7·2	6·4	5·6	4·8
		35	475	430		M 20	22	6	388	368	390	366	18·1	16	14	13	11	10
		45	490	440		M 24	26	6	394	368	396	366	26·1	25	22	20	17	15
419	421	25	510	470	16	M 16	18	6	439	419	441	417	12·5	6	5·4	5	4·2	3·6
		35	525	480		M 20	22	6	439	419	441	417	20·2	13	11	10	9	8
		45	545	495		M 24	26	8	445	419	447	417	31·5	20	18	16	14	12
(457)	459	30	550	510	20	M 16	18	6	477	457	479	455	16·5	6	5·4	5	4·2	3·6
		35	565	520		M 20	22	6	477	457	479	455	22	13	11	10	9	8
		45	580	530		M 24	26	8	483	457	485	455	32·4	20	18	16	14	12
508	510	30	600	560	20	M 16	18	6	528	508	530	506	18·1	5	4·5	4	3·5	3
		35	615	570		M 20	22	6	528	508	530	506	24·1	10	9	8	7	6
		45	635	585		M 24	26	8	534	508	536	506	37	16	14	13	11	10

NOTE 1 — The sealing surface shall only be machined after completion of all welding.

NOTE 2 — Sizes shown in parentheses are of second preference.

†*s* is the normal thickness of shell. If higher or smaller thickness is desired, it shall be mentioned in the order.

(*Continued*)

TABLE 1 DIMENSIONS FOR WELDED SHELL FLANGES FOR CARBON STEEL PRESSURE VESSELS AND EQUIPMENT — *Contd*

All dimensions in millmetres.

NOMINAL DIAMETER	FLANGE				BOLTS			VESSEL THICKNESS s† *Min*	GROOVE FORM				WEIGHT OF A SINGLE kg APPROX	MAXIMUM ALLOWABLE PRESSURE IN kgf/cm² AT THE MAXIMUM WORKING TEMPERATURE IN °C				
									T & M		G & F							
	d_1	h	d_2	d_3	Number	Thread Nominal Dia	d_4		d_5	d_6	d_7	d_8		20	120	200	250	300
600	602	30	700	660	24	M 16	18	6	626	600	628	598	22·9	5	4·5	4	3·5	3
		35	710	665		M 20	22	6	626	600	628	598	29·4	10	9	8	7	6
		50	730	680		M 24	26	8	632	600	634	598	49·3	16	14	13	11	10
700	702	30	800	760	28	M 16	18	6	726	700	728	698	26·5	4	3·6	3·2	2·8	2·4
		40	810	765		M 20	22	6	726	700	728	698	37·9	8	7·2	6·4	5·6	4·8
		50	830	780		M 24	26	8	732	700	734	698	56·6	13	11	10	9	8
800	802	30	900	860	32	M 16	18	6	826	800	828	798	30·1	4	3·6	3·2	2·8	2·4
		40	915	870		M 20	22	6	826	800	828	798	44·8	8	7·2	6·4	5·6	4·8
		55	930	880		M 24	26	8	832	800	834	798	70·1	13	11	10	9	8
900	902	40	1 015	970	36	M 20	22	6	926	900	928	898	50·1	6	5·4	5	4·2	3·6
		60	1 030	980		M 24	26	8	932	900	934	898	85·4	13	11	10	9	8
1 000	1 002	45	1 115	1 070	40	M 20	22	6	1 026	1 000	1 028	998	62·8	6	5·4	5	4·2	3·6
		60	1 130	1 080		M 24	26	8	1 032	1 000	1 034	998	94·1	10	9	8	7	6
1 100	1 102	45	1 215	1 170	44	M 20	22	6	1 126	1 100	1 128	1 098	68·5	5	4·5	4	3·5	3
		65	1 230	1 180		M 24	26	8	1 132	1 100	1 134	1 098	112	10	9	8	7	6
1 200	1 202	45	1 315	1 270	48	M 20	22	8	1 226	1 200	1 228	1 198	75·5	5	4·5	4	3·5	3
		65	1 330	1 280		M 24	26	8	1 232	1 200	1 234	1 198	121	8	7·2	6·4	5·6	4·8

(1 300)	1 303	45	1 415	1 370	52	M 20	22	8	1 326	1 300	1 328	1 298	80·9	5	4·5	4	3·5	3
		70	1 435	1 385		M 24	26	8	1 332	1 300	1 334	1 298	146	8	7·2	6·4	5·6	4·8
1 400	1 403	45	1 515	1 470	56	M 20	22	8	1 426	1 400	1 428	1 398	86·8	4	3·6	3·2	2·8	2·4
		70	1 535	1 485		M 24	26	8	1 432	1 400	1 434	1 398	157	8	7·2	6·4	5·6	4·8
(1 500)	1 503	50	1 615	1 570	60	M 20	22	8	1 526	1 500	1 528	1 498	103	4	3·6	3·2	2·8	2·4
		70	1 635	1 585		M 24	26	8	1 532	1 500	1 534	1 498	167	6	5·4	5	4·2	3·6
1 600	1 603	55	1 715	1 670	64	M 20	22	8	1 626	1 600	1 628	1 598	120	4	3·6	3·2	2·8	2·4
		70	1 735	1 685		M 24	26	8	1 632	1 600	1 634	1 598	178	6	5·4	5	4·2	3·6
(1 700)	1 703	55	1 815	1 770	68	M 20	22	8	1 726	1 700	1 728	1 698	128	4	3·6	3·2	2·8	2·4
		75	1 835	1 785		M 24	26	8	1 732	1 700	1 734	1 698	202	6	5·4	5	4·2	3·6
1 800	1 803	55	1 915	1 870	72	M 20	22	8	1 826	1 800	1 828	1 798	134	3	2·7	2·4	2·1	1·8
		80	1 940	1 890		M 24	26	8	1 832	1 800	1 834	1 798	236	6	5·4	5	4·2	3·6
(1 900)	1 903	55	2 015	1 970	76	M 20	22	8	1 926	1 900	1 928	1 898	142	3	2·7	2·4	2·1	1·8
		80	2 040	1 990		M 24	26	8	1 932	1 900	1 934	1 898	250	5	4·5	4	3·5	3
2 000	2 003	55	2 115	2 070	80	M 20	22	8	2 026	2 000	2 028	1 998	150	3	2·7	2·4	2·1	1·8
		80	2 140	2 090		M 24	26	8	2 032	2 000	2 034	1 998	260	5	4·5	4	3·5	3
(2 100)	2 103	60	2 215	2 170	84	M 20	22	8	2 126	2 100	2 128	2 098	172	3	2·7	2·4	2·1	1·8
		85	2 240	2 190		M 24	26	8	2 132	2 100	2 134	2 098	291	5	4·5	4	3·5	3
2 200	2 203	60	2 315	2 270	88	M 20	22	8	2 226	2 200	2 228	2 198	178	3	2·7	2·4	2·1	1·8
		90	2 340	2 290		M 24	26	8	2 232	2 200	2 234	2 198	332	5	4·5	4	3·5	3

NOTE 1 — The sealing surface shall only be machined after completion of all welding.

NOTE 2 — Sizes shown in parentheses are of second preference.

†*s* is the normal thickness of shell. If higher or smaller thickness is desired, it shall be mentioned in the order.

(*Continued*)

TABLE 1 DIMENSIONS FOR WELDED SHELL FLANGES FOR CARBON STEEL PRESSURE VESSELS AND EQUIPMENT — *Contd*

All dimensions in millimetres.

Nominal Diameter	Flange				Bolts			Vessel Thickness s†	Groove Form				Weight of a Single kg Approx	Maximum Allowable Pressure in kgf/cm² at the Maximum Working Temperature in °C				
									T & M		G & F							
	d_1	h	d_2	d_3	Number	Thread Nominal Dia	d_4	*Min*	d_5	d_6	d_7	d_8		20	120	200	250	300
(2 300)	2 303	60	2 415	2 370	92	M 20	22	8	2 326	2 300	2 328	2 298	187	2	1·8	1·6	1·4	1·2
		90	2 440	2 390		M 24	26	8	2 332	2 300	2 334	2 298	340	5	4·5	4	3·5	3
2 400	2 403	60	2 520	2 475	96	M 20	22	8	2 426	2 400	2 428	2 398	203	2	1·8	1·6	1·4	1·2
		85	2 540	2 490		M 24	26	8	2 432	2 400	2 434	2 398	334	4	3·6	3·2	2·8	2·4
2 600	2 603	60	2 720	2 675	104	M 20	22	8	2 626	2 600	2 628	2 598	220	2	1·8	1·6	1·4	1·2
		95	2 745	2 695		M 24	26	8	2 632	2 600	2 634	2 598	417	4	3·6	3·2	2·8	2·4
2 800	2 803	65	2 920	2 875	112	M 20	22	8	2 826	2 800	2 828	2 798	255	2	1·8	1·6	1·4	1·2
		100	2 950	2 900		M 24	26	8	2 832	2 800	2 834	2 798	490	4	3·6	3·2	2·8	2·4
3 000	3 003	70	3 120	3 075	120	M 20	22	8	3 026	3 000	3 028	2 998	297	2	1·8	1·6	1·4	1·2
		95	3 150	3 100		M 24	26	8	3 032	3 000	3 034	2 998	496	3	2·7	2·4	2·1	1·8
3 200	3 203	75	3 320	3 275	128	M 20	22	8	3 226	3 200	3 228	3 198	336	2	1·8	1·6	1·4	1·2
		100	3 350	3 300		M 24	26	8	3 232	3 200	3 234	3 198	558	3	2·7	2·4	2·1	1·8

NOTE 1 — The sealing surface shall only be machined after completion of all welding.

NOTE 2 — Sizes shown in parentheses are of second preference.

†*s* is the normal thickness of shell. If higher or smaller thickness is desired, it shall be mentioned in the order.

Indian Standard

SPECIFICATION FOR SHELL FLANGES FOR VESSELS AND EQUIPMENT : WELDED NECK SHELL FLANGES FOR CARBON STEEL FOR PRESSURE VESSELS AND EQUIPMENT

1. SCOPE

1.1 This standard specifies the requirements for welding neck shell flanges for carbon steel pressure vessels and equipment.

2. DIMENSIONS

2.1 The dimensions for welded neck shell flanges, the diameter and number of bolts and weight shall be as given in Table 1.

3. MATERIAL

3.1 Flange — The material of the neck shell flanges shall conform to the requirements specified in IS : 4864-1968.

3.2 Bolts and Nuts — Bolts and nuts shall conform to the requirements specified in IS : 4864-1968.

3.3 Gaskets — With these flanges, gaskets conforming to IS : 4870-1968 shall be used.

4. DESIGNATION

4.1 Welded neck flange shall be designated by the machining condition and groove form in which supplied, nominal diameter (d_1), thickness (h_1) and number of this standard.

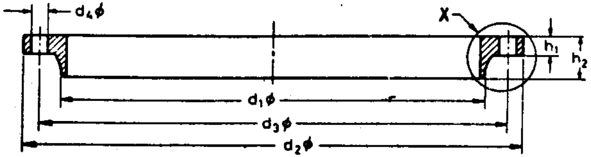
Example:

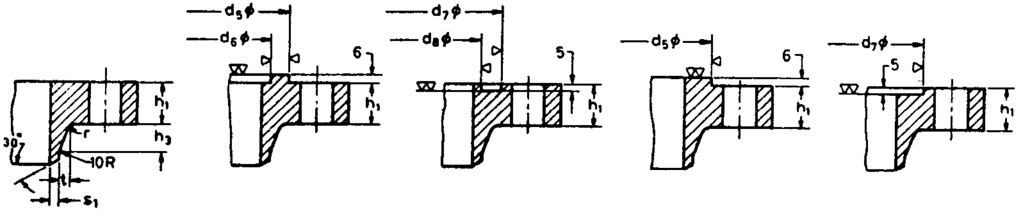
> A welded neck flange supplied in machining condition **B** with groove form **F** having a nominal diameter $d_1 = 600$ mm and thickness $h_1 = 40$ mm shall be designated as:
>
> Welded Neck Flange **BF** 600 × 40 IS : 4867-1968

TABLE 1 DIMENSIONS FOR WELDED NECK FLANGES FOR CARBON STEEL PRESSURE VESSELS AND EQUIPMENT

(*Clause* 2.1)

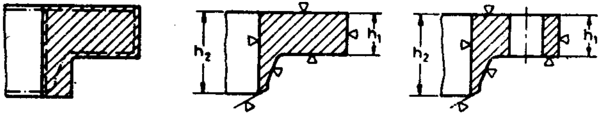
All dimensions in millimetres.





FORM W FORM T FORM G FORM M FORM F

DETAILS AT X



A UNMACHINED B MACHINED C MACHINED AND DRILLED

MACHINING CONDITIONS

TABLE 1 — *Contd*

NOMINAL DIAMETER d_1	FLANGE								BOLTS			GROOVE FORM				WEIGHT OF A SINGLE FLANGE kg APPROX	MAXIMUM ALLOWABLE PRESSURE IN kgf/cm² AT THE MAXIMUM WORKING TEMPERATURE IN °C				
	h_1	d_2	d_3	h_2	h_3	s_1*	t	r	Number	Thread Nominal Dia	d_4	T & M		G & F							
												d_5	d_6	d_7	d_8		20	120	200	250	300
324	20	415	375	49	20	6	6	6	12	M 16	18	344	324	346	322	10·5	8	7·2	6·4	5·6	4·8
	25	430	385	54	20	6	8	6		M 20	22	344	324	346	322	14·5	13	11	10	9	8
	30	445	395	59	20	6	8	6		M 24	26	350	324	352	322	18·9	25	22	20	17	15
368	20	460	420	49	20	6	6	6	16	M 16	18	386	368	390	366	11·8	8	7·2	6·4	5·6	4·8
	25	475	430	54	20	6	8	6		M 20	22	386	368	390	366	16	16	14	13	11	10
	35	490	440	64	20	6	8	8		M 24	26	394	368	396	366	24·1	25	22	20	17	15
419	20	510	470	49	20	6	6	6	16	M 16	18	439	419	441	417	13·4	6	5·4	5	4·2	3·6
	25	525	480	54	20	6	8	6		M 20	22	439	419	441	417	19	13	11	10	9	8
	35	545	495	67	20	8	8	8		M 24	26	445	419	447	417	30	20	18	16	14	12
(457)	20	550	510	49	20	6	6	6	20	M 16	18	477	457	479	455	14·6	6	5·4	5	4·2	3·6
	25	565	520	54	20	6	8	6		M 20	22	477	457	479	455	21·1	13	11	10	9	8
	35	580	530	67	20	8	8	8		M 24	26	483	457	485	455	31·3	20	18	16	14	12
508	25	600	560	54	20	6	6	6	20	M 16	18	528	508	530	506	19·5	5	4·5	4	3·5	3
	30	615	570	59	20	6	8	6		M 20	22	528	508	530	506	25·6	10	9	8	7	6
	35	635	585	67	20	8	8	8		M 24	26	534	508	536	506	35·6	16	14	13	11	10
	45	645	590	82	25	8	12	8		M 27	30	540	508	542	506	48·6	25	22	20	17	15

NOTE — Sizes shown in parentheses are of second preference.

*The dimension s_1 of the welding neck generally corresponds with the thickness of shell, the dimension indicated is for guidance. When s_1 is required to be larger the inside diameter will become less and this shall be agreed upon between the purchaser and the supplier.

(*Continued*)

TABLE 1 DIMENSIONS FOR WELDED NECK FLANGES FOR CARBON STEEL PRESSURE VESSELS AND EQUIPMENT — *Contd*

All dimensions in millimetres.

Nominal Diameter d_1	Flange								Bolts			Groove Form				Weight of a Single Flange kg Approx	Maximum Allowable Pressure in kgf/cm² at the Maximum Working Temperature in °C				
												T & M		G & F							
	h_1	d_2	d_3	h_2	h_3	s_1*	t	r	Number	Thread Nominal Dia	d_4	d_5	d_6	d_7	d_8		20	120	200	250	300
600	30	710	665	59	20	6	8	6	24	M 20	22	626	600	628	598	30·7	10	9	8	7	6
	40	730	680	72	20	8	10	8		M 24	26	632	600	634	598	48	16	14	13	11	10
	45	745	690	82	25	8	12	8		M 27	30	632	600	634	598	59·7	20	18	16	14	12
	50	760	695	95	30	10	12	10		M 30	33	636	600	638	598	75·3	25	22	20	17	15
700	30	810	765	59	20	6	8	6	28	M 20	22	726	700	728	698	34·9	8	7·2	6·4	5·6	4·8
	40	830	780	72	20	8	10	8		M 24	26	732	700	734	698	55·3	13	11	10	9	8
	50	845	790	92	30	8	12	10		M 27	30	732	700	734	698	76·7	20	18	16	14	12
	55	865	800	105	35	10	14	10		M 30	33	736	700	738	698	99·3	25	22	20	17	15
800	35	915	870	64	20	6	8	8	32	M 20	22	826	800	828	798	47·9	8	7·2	6·4	5·6	4·8
	45	930	880	82	25	8	12	8		M 24	26	832	800	834	798	72	13	11	10	9	8
	50	945	890	95	30	10	12	10		M 27	30	832	800	834	798	91·6	20	18	16	14	12
	55	965	900	108	35	12	14	10		M 30	33	836	800	838	798	117	25	22	20	17	15
900	35	1 015	970	64	20	6	8	8	36	M 20	22	926	900	928	898	53·5	6	5·4	5	4·2	3·6
	45	1 030	980	82	25	8	12	8		M 24	26	932	900	934	898	80	13	11	10	9	8
	50	1 045	990	95	30	10	12	8		M 27	30	932	900	934	898	101	16	14	13	11	10
	55	1 065	1 000	108	35	12	14	10		M 30	33	936	900	938	898	131	20	18	16	14	12
1 000	35	1 115	1 070	64	20	6	8	8	40	M 20	22	1 026	1 000	1 028	998	58·8	6	5·4	5	4·2	3·6
	45	1 130	1 080	82	25	8	12	8		M 24	26	1 032	1 000	1 034	998	88·6	10	9	8	7	6
	55	1 150	1 095	105	35	10	14	10		M 27	30	1 032	1 000	1 034	998	128	16	14	13	11	9
	60	1 170	1 105	118	40	12	16	10		M 30	33	1 036	1 000	1 038	998	163	20	18	16	14	12

1 100	35	1 215	1 170	64	20	6	8	8	44	M 20	22	1 126	1 100	1 128	1 098	64·8	5	4·5	4	3·5	3
	45	1 230	1 180	82	25	8	12	8		M 24	26	1 132	1 100	1 134	1 098	96·3	10	9	8	7	6
	55	1 250	1 195	105	35	10	14	10		M 27	30	1 132	1 100	1 134	1 098	141	13	11	10	9	8
	60	1 270	1 205	118	40	12	16	10		M 30	33	1 136	1 100	1 138	1 098	179	16	14	13	11	9
1 200	35	1 315	1 270	67	20	8	8	8	48	M 20	22	1 226	1 200	1 228	1 198	75·1	5	4·5	4	3·5	3
	45	1 330	1 280	82	25	8	12	8		M 24	26	1 232	1 200	1 234	1 198	105	8	7	6	5	4
	55	1 350	1 295	105	35	10	14	10		M 27	30	1 232	1 200	1 234	1 198	153	13	11	10	9	8
	60	1 370	1 305	118	40	12	16	10		M 30	33	1 236	1 200	1 238	1 198	197	16	14	13	11	9
(1 300)	35	1 415	1 370	67	20	8	8	8	52	M 20	22	1 326	1 300	1 328	1 298	80	5	4·5	4	3·5	3
	50	1 435	1 385	92	30	8	12	10		M 24	26	1 332	1 300	1 334	1 298	131	8	7·2	6·4	5·6	4·8
	55	1 450	1 395	105	35	10	14	10		M 27	30	1 332	1 300	1 334	1 298	165	13	11	10	9	8
	60	1 470	1 405	118	40	12	16	10		M 30	33	1 336	1 300	1 338	1 298	210	16	14	13	11	9
1 400	35	1 515	1 470	67	20	8	8	8	56	M 20	22	1 426	1 400	1 428	1 398	86·4	4	3·6	3·2	2·8	2·4
	50	1 535	1 485	92	30	8	12	10		M 24	26	1 432	1 400	1 434	1 398	141	8	7·2	6·4	5·6	4·8
	55	1 550	1 495	105	35	10	14	10		M 27	30	1 432	1 400	1 434	1 398	178	10	9	8	7	6
	60	1 570	1 505	118	40	12	16	10		M 30	33	1 436	1 400	1 438	1 398	224	13	11	10	9	8
(1 500)	35	1 615	1 570	67	20	8	8	8	60	M 20	22	1 526	1 500	1 528	1 498	92·6	4	3·6	3·2	2·3	2·4
	50	1 635	1 585	92	30	8	12	10		M 24	26	1 532	1 500	1 534	1 498	151	6	5·4	5	4·2	3·6
	60	1 655	1 600	115	40	10	16	10		M 27	30	1 532	1 500	1 534	1 498	215	10	9	8	7	6
	65	1 675	1 610	128	45	12	18	10		M 30	33	1 536	1 500	1 538	1 498	268	13	11	10	9	8
1 600	35	1 715	1 670	67	20	8	8	8	64	M 20	22	1 626	1 600	1 628	1 598	99	4	3·6	3·2	2·8	2·4
	50	1 735	1 685	92	30	8	12	10		M 24	26	1 632	1 600	1 634	1 598	161	6	5·4	5	4·2	3·6
	60	1 755	1 700	115	40	10	16	10		M 27	30	1 632	1 600	1 634	1 598	229	10	9	8	7	6
	65	1 775	1 710	128	45	12	18	10		M 30	33	1 636	1 600	1 638	1 598	282	13	11	0	9	8

Note — Sizes shown in parentheses are of second preference.

*The dimension s_1 of the welding neck generally corresponds with the thickness of shell, the dimension indicated is for guidance. When s_1 is required to be larger the inside diameter will become less and this shall be agreed upon between the purchaser and the supplier.

(*Continued*)

TABLE 1 DIMENSIONS FOR WELDED NECK FLANGES FOR CARBON STEEL PRESSURE VESSELS AND EQUIPMENT — *Contd*

All dimensions in millimetres.

NOMINAL DIAMETER d_1	FLANGE								BOLTS			GROOVE FORM				WEIGHT OF A SINGLE FLANGE kg APPROX	MAXIMUM ALLOWABLE PRESSURE IN kgf/cm² AT THE MAXIMUM WORKING TEMPERATURE IN °C				
												T & M		G & F							
	h_1	d_2	d_3	h_2	h_3	s_1*	t	r	Number	Thread Nominal Dia	d_4	d_5	d_6	d_7	d_8		20	120	200	250	300
(1 700)	40	1 815	1 770	72	20	8	10	8	68	M 20	22	1 726	1 700	1 728	1 698	118	4	3·6	3·2	2·8	2·4
	50	1 835	1 785	92	30	8	12	10		M 24	26	1 732	1 700	1 734	1 698	170	6	5·4	5	4·2	3·6
	60	1 855	1 800	115	40	10	16	10		M 27	30	1 732	1 700	1 734	1 698	242	10	9	8	7	6
	65	1 875	1 810	128	45	12	18	10		M 30	33	1 736	1 700	1 738	1 698	302	13	11	10	9	8
1 800	40	1 915	1 870	72	20	8	10	8	72	M 20	22	1 826	1 800	1 828	1 798	125	3	2·7	2·4	2·1	1·8
	55	1 940	1 890	102	35	8	14	10		M 24	26	1 832	1 800	1 834	1 798	207	6	5·4	5	4·2	3·6
	60	1 955	1 900	115	40	10	16	10		M 27	30	1 832	1 800	1 834	1 798	255	8	7·2	6·4	5·6	4·8
	65	1 975	1 910	128	45	12	18	10		M 30	33	1 836	1 800	1 838	1 798	319	10	9	8	7	6
(1 900)	40	2 015	1 970	72	20	8	10	8	76	M 20	22	1 926	1 900	1 928	1 898	132	3	2·7	2·4	2·1	1·8
	55	2 040	1 990	102	35	8	14	10		M 24	26	1 932	1 900	1 934	1 898	217	5	4·5	4	3·5	3
	65	2 060	2 005	125	45	10	18	10		M 27	30	1 932	1 900	1 934	1 898	304	8	7·2	6·4	5·6	4·8
	70	2 080	2 015	138	50	12	20	12		M 30	33	1 936	1 900	1 938	1 898	374	10	9	8	7	6
2 000	40	2 115	2 070	72	20	8	10	8	80	M 20	22	2 026	2 000	2 028	1 998	139	3	2·7	2·4	2·1	1·8
	55	2 140	2 090	102	35	8	14	10		M 24	26	2 032	2 000	2 034	1 998	226	5	4·5	4	3·5	3
	65	2 160	2 105	125	45	10	18	10		M 27	30	2 032	2 000	2 034	1 998	319	8	7·2	6·4	5·6	4·8
	70	2 180	2 115	138	50	12	20	12		M 30	33	2 036	2 000	2 038	1 998	393	10	9	8	7	6
(2 100)	40	2 215	2 170	72	20	8	10	8	84	M 20	22	2 126	2 100	2 128	2 098	146	3	2·7	2·4	2·1	1·8
	55	2 240	2 190	102	35	8	14	10		M 24	26	2 132	2 100	2 134	2 098	240	5	4·5	4	3·5	3
	65	2 260	2 205	125	45	10	18	10		M 27	30	2 132	2 100	2 134	2 098	327	8	7·2	6·4	5·6	4·8
	75	2 285	2 220	148	55	12	22	12		M 30	33	2 136	2 100	2 138	2 098	457	10	9	8	7	6

2 200	40	2 315	2 270	72	20	8	10	8	88	M 20	22	2 226	2 200	2 228	2 198	153	3	2·7	2·4	2·1	1·8
	55	2 340	2 290	102	35	8	14	10		M 24	26	2 232	2 200	2 234	2 198	251	5	4·5	4	3·5	3
	65	2 360	2 305	125	45	10	18	10		M 27	30	2 232	2 200	2 234	2 198	350	6	5·4	5	4·2	3·6
	75	2 385	2 320	148	55	12	22	12		M 30	33	2 236	2 200	2 238	2 198	475	10	9	8	7	6
(2 300)	40	2 415	2 370	72	20	8	10	8	92	M 20	22	2 326	2 300	2 328	2 298	160	2	1·8	1·6	1·4	1·2
	55	2 440	2 390	102	35	8	14	10		M 24	26	2 332	2 300	2 334	2 298	262	5	4·5	4	3·5	3
	65	2 460	2 405	125	45	10	18	10		M 27	30	2 332	2 300	2 334	2 298	365	6	5·4	5	4·2	3·6
	75	2 485	2 420	148	55	12	22	12		M 30	33	2 336	2 300	2 338	2 298	496	8	7·2	6·4	5·6	4·8
2 400	45	2 520	2 475	82	25	8	12	8	96	M 20	22	2 426	2 400	2 428	2 398	193	2	1·8	1·6	1·4	1·2
	55	2 540	2 490	102	35	8	14	10		M 24	26	2 432	2 400	2 434	2 398	273	4	3·6	3·2	2·8	2·4
	70	2 565	2 510	135	50	10	20	12		M 27	30	2 432	2 400	2 434	2 398	427	6	5·4	5	4·2	3·6
	75	2 585	2 520	148	55	12	22	12		M 30	33	2 436	2 400	2 438	2 398	519	8	7·2	6·4	5·6	4·8
2 600	45	2 720	2 675	82	25	8	12	8	104	M 20	22	2 626	2 600	2 628	2 598	213	2	1·8	1·6	1·4	1·2
	60	2 745	2 695	112	40	8	16	10		M 24	26	2 632	2 600	2 634	2 598	334	4	3·6	3·2	2·8	2·4
	70	2 765	2 710	135	50	10	20	12		M 27	30	2 632	2 600	2 634	2 598	458	6	5·4	5	4·2	3·6
	85	2 785	2 720	168	65	12	22	12		M 30	33	2 636	2 600	2 638	2 598	640	8	7·2	6·4	5·6	4·8
2 800	45	2 920	2 875	82	25	8	12	8	112	M 20	22	2 826	2 800	2 828	2 798	229	2	1·8	1·6	1·4	1·2
	65	2 950	2 900	122	45	8	18	10		M 24	26	2 832	2 800	2 834	2 798	410	4	3·6	3·2	2·8	2·4
	70	2 965	2 910	135	50	10	20	12		M 27	30	2 832	2 800	2 834	2 798	491	5	4·5	4	3·5	3
	85	2 985	2 920	168	65	12	22	12		M 30	33	2 836	2 800	2 838	2 798	682	8	7·2	6·4	5·6	4·8
3 000	45	3 120	3 075	82	25	8	12	8	120	M 20	22	3 026	3 000	3 028	2 998	245	2	1·8	1·6	1·4	1·2
	65	3 150	3 100	122	45	8	18	10		M 24	26	3 032	3 000	3 034	2 998	436	3	2·7	2·4	2·1	1·8
	75	3 170	3 115	145	55	10	22	12		M 27	30	3 032	3 000	3 034	2 998	584	5	4·5	4	3·5	3
	85	3 185	3 120	168	65	12	22	12		M 30	33	3 036	3 000	3 038	2 998	733	8	7·2	6·4	5·6	4·8
3 200	45	3 320	3 275	82	25	8	12	8	128	M 20	22	3 226	3 200	3 228	3 198	260	2	1·8	1·6	1·4	1·2
	65	3 350	3 300	122	45	8	18	10		M 24	26	3 232	3 200	3 234	3 198	462	3	2·7	2·4	2·1	1·8
	80	3 370	3 315	155	60	10	22	12		M 27	30	3 232	3 200	3 234	3 198	665	5	4·5	4	3·5	3
	85	3 385	3 320	168	65	12	22	12		M 30	33	3 236	3 200	3 238	3 198	780	6	5·4	5	4·2	3·6

NOTE — Sizes shown in parentheses are of second preference.

*The dimension s_1 of the welding neck generally corresponds with the thickness of shell, the dimension indicated is for guidance. When s_1 is required to be larger the inside diameter will become less and this shall be agreed upon between the purchaser and the supplier.

Indian Standard

SPECIFICATION FOR SHELL FLANGES FOR VESSELS AND EQUIPMENT : WELDED SHELL FLANGES FOR STAINLESS STEEL PRESSURE VESSELS AND EQUIPMENT

1. SCOPE

1.1 This standard specifies the requirements for welded shell flanges for stainless steel pressure vessels and equipment.

2. DIMENSIONS

2.1 The dimensions for welded shell flanges, the diameter and number of bolts, vessel thickness and weight shall be as given in Table 1.

3. MATERIAL

3.1 Flange — The material of the welded shell flanges shall conform to the requirements specified in IS : 4864-1968

3.1.1 The material for the backing plate shall be the same as the material of the shell or as may be agreed to between the supplier and the purchaser.

3.2 Bolts and Nuts — Bolts and nuts shall conform to the requirements specified in IS : 4864-1968.

3.3 Gaskets — With these flanges, gaskets conforming to IS : 4870-1968 shall be used.

4. DESIGNATION

4.1 Welded flange shall be designated by the machining condition and groove form in which supplied, nominal diameter, thickness (*h*) and number of this standard.

Example:

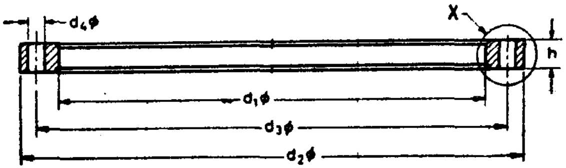
A welded flange supplied in machining condition **B** with groove form **F** having a nominal diameter 600 mm and thickness $h = 35$ mm shall be designated as:

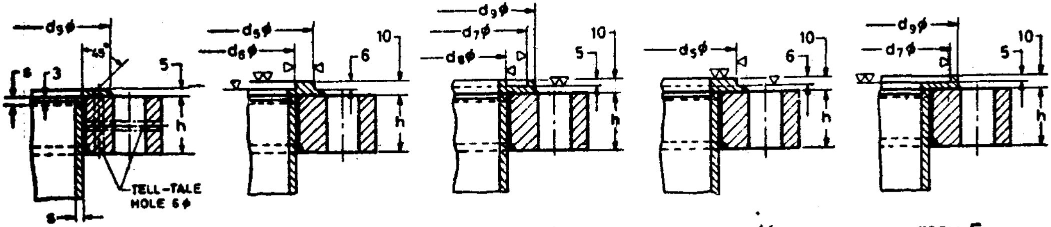
Welded Flange **BF** 600 × 35 IS : 4868-1968.

TABLE 1 DIMENSIONS FOR WELDED SHELL FLANGES FOR STAINLESS STEEL PRESSURE VESSELS AND EQUIPMENT

(*Clause* 2.1)

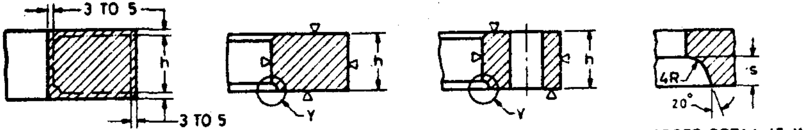
All dimensions in millimetres.





FORM W FORM T FORM G FORM M FORM F

DETAILS AT X (SHOWN WITH SHELL)



ENLARGED DETAIL AT Y

*A UNMACHINED B MACHINED C MACHINED AND DRILLED

MACHINING CONDITIONS

*The machining allowance shall be so selected that the finished profile may be achieved without difficulty. In the absence of agreement between the purchaser and the supplier regarding the machining allowance, the values given in the figure should be used. For flange form **T**, the height of the tongue or for form **M** the height of male part should be taken into account for backing plate.

(*Continued*)

TABLE 1 DIMENSIONS FOR WELDED SHELL FLANGES FOR STAINLESS STEEL PRESSURE VESSELS AND EQUIPMENT — *Contd*

All dimensions in millimetres.

NOMINAL DIAMETER	FLANGE					BOLTS			VESSEL THICKNESS s† *Min*	GROOVE FORM				WEIGHT OF A SINGLE FLANGE kg APPROX	MAXIMUM ALLOWABLE PRESSURE IN kgf/cm² AT THE MAXIMUM WORKING TEMPERATURE IN °C				
	d_1	h	d_2	d_3	d_9	Number	Thread Nominal Dia	d_4		T & M		G & F							
										d_5	d_6	d_7	d_8		20	120	200	250	300
324	326	25	415	375	350	12	M 16	18	4	344	324	346	322	9·7	8	7·2	6·4	5·6	4·8
		30	430	385	355		M 20	22	4	344	324	346	322	13·5	13	11	10	9	8
		40	445	395	360		M 24	26	5	350	324	352	322	20·5	25	22	20	17	15
368	370	25	460	420	395	16	M 16	18	4	388	368	390	366	10·7	8	7·2	6·4	5·6	4·8
		35	475	430	400		M 20	22	4	388	368	390	366	17·4	16	14	13	11	10
		45	490	440	405		M 24	26	5	394	368	396	366	25·3	25	22	20	17	15
419	421	25	510	470	445	16	M 16	18	4	439	419	441	417	12·1	6	5·4	4·8	4·2	3·6
		35	525	480	450		M 20	22	4	439	419	441	417	19·4	13	11	10	9	8
		45	545	495	460		M 24	26	5	445	419	447	417	30·2	20	18	16	14	12
(457)	459	30	550	510	485	20	M 16	18	4	477	457	479	455	15·6	6	5·4	4·8	4·2	3·6
		35	565	520	490		M 20	22	4	477	457	479	455	21·2	13	11	10	9	8
		45	580	530	495		M 24	26	5	483	457	485	455	31	20	18	16	14	12
508	510	30	600	560	535	20	M 16	18	4	528	508	530	506	17·2	5	4·5	4	3·5	3
		35	615	570	540		M 20	22	5	528	508	530	506	23·2	10	9	8	7	6
		40	635	585	550		M 24	26	6	534	508	536	506	31·7	16	14	13	11	10
		50	645	590	555		M 27	30	7	540	508	542	506	42·6	25	22	20	17	15

600	602	30	700	660	635	24	M 16	18	4	626	600	628	598	22·1	5	4·5	4	3·5	3
		40	710	665	640		M 20	22	5	626	600	628	598	31·9	10	9	8	7	6
		45	730	680	645		M 24	26	6	632	600	634	598	42·4	16	14	13	11	10
		50	745	690	655		M 27	30	7	632	600	634	598	52·3	20	18	16	14	12
		55	760	695	655		M 30	33	8	636	600	638	598	64·1	25	22	20	17	15
700	702	30	800	760	735	28	M 16	18	4	726	700	728	698	25·5	4	3·6	3·2	2·8	2·4
		40	810	765	735		M 20	22	5	726	700	728	698	36·6	8	7·2	6·4	5·6	4·8
		45	830	780	745		M 24	26	6	732	700	734	698	48·5	13	11	10	9	8
		55	845	790	755		M 27	30	8	732	700	734	698	72·7	20	18	16	14	12
		65	865	800	760		M 30	33	10	736	700	738	698	89·7	25	22	20	17	15
800	802	30	900	860	835	32	M 16	18	4	826	800	828	798	29	4	3·6	3·2	2·1	2·4
		40	915	870	840		M 20	22	5	826	800	828	798	43·6	8	7·2	6·4	5·6	4·8
		50	930	880	845		M 24	26	6	832	800	834	798	61	13	11	10	9	8
		65	945	890	855		M 27	30	8	832	800	834	798	88·4	20	18	16	14	12
		75	965	900	860		M 30	33	10	836	800	838	798	117	25	22	20	17	15
900	902	40	1 015	970	940	36	M 20	22	5	926	900	928	898	48·5	6	5·4	5	4·5	3·6
		60	1 030	980	945		M 24	26	6	932	900	934	898	81·8	13	11	10	9	8
		65	1 045	990	955		M 27	30	8	932	900	934	898	99	16	14	13	11	10
		75	1 065	1 000	960		M 30	33	10	936	900	938	898	130	20	18	16	14	12
1 000	1 002	45	1 115	1 070	1 040	40	M 20	22	5	1 026	1 000	1 028	998	60·6	6	5·4	5	4·5	3·6
		60	1 130	1 080	1 045		M 24	26	6	1 032	1 000	1 034	998	90·2	10	9	8	7	6
1 100	1 102	45	1 215	1 170	1 140	44	M 20	22	5	1 126	1 100	1 128	1 098	66·1	5	4·5	4	3·5	3
1 200	1 202	45	1 315	1 270	1 240	48	M 20	22	6	1 226	1 200	1 228	1 198	71·5	5	4·5	4	3·5	3
(1 300)	1 303	50	1 415	1 370	1 340	52	M 20	22	6	1 326	1 300	1 328	1 298	85·5	5	4·5	4	3·5	3

Note 1 — The sealing surface shall only be machined after completion of all welding.

Note 2 — Sizes shown in parentheses are of second preference.

†*s* is the normal thickness of shell. If higher or smaller thickness is desired, it shall be mentioned in the order. (*Continued*)

TABLE 1 DIMENSIONS FOR WELDED SHELL FLANGES FOR STAINLESS STEEL PRESSURE VESSELS AND EQUIPMENT — *Contd*

All dimensions in millimetres.

NOMINAL DIAMETER	FLANGE					BOLTS			VESSEL THICKNESS s† *Min*	GROOVE FORM				WEIGHT OF A SINGLE FLANGE kg APPROX	MAXIMUM ALLOWABLE PRESSURE IN kgf/cm² AT THE MAXIMUM WORKING TEMPERATURE IN °C				
	d_1	h	d_2	d_3	d_9	Number	Thread Nominal Dia	d_4		T & M		G & F							
										d_5	d_6	d_7	d_8		20	120	200	250	300
1 400	1 403	50	1 515	1 470	1 440	56	M 20	22	6	1 426	1 400	1 428	1 398	91·2	4	3·6	3·2	2·8	2·4
(1 500)	1 503	55	1 615	1 570	1 540	60	M 20	22	6	1 526	1 500	1 528	1 498	107	4	3·6	3·2	2·8	2·4
1 600	1 603	55	1 715	1 670	1 640	64	M 20	22	6	1 626	1 600	1 628	1 598	115	4	3·6	3·2	2·8	2·4
(1 700)	1 703	55	1 815	1 770	1 740	68	M 20	22	6	1 726	1 700	1 728	1 698	122	4	3·6	3·2	2·8	2·4
1 800	1 803	55	1 915	1 870	1 840	72	M 20	22	6	1 826	1 800	1 828	1 798	128	3	2·7	2·4	2·1	1·8
(1 900)	1 903	60	2 015	1 970	1 940	76	M 20	22	6	1 926	1 900	1 928	1 898	147	3	2·7	2·4	2·1	1·8
2 000	2 003	60	2 115	2 070	2 040	80	M 20	22	6	2 026	2 000	2 028	1 998	155	3	2·7	2·4	2·1	1·8

NOTE 1 — The sealing surface shall only be machined after completion of all welding.

NOTE 2 — Sizes shown in parentheses are of second preference.

†s is the normal thickness of shell. If higher or smaller thickness is desired, it shall be mentioned in the order.

Indian Standard

SPECIFICATION FOR SHELL FLANGES FOR VESSELS AND EQUIPMENT : WELDED SHELL FLANGES WITH HUB FOR STAINLESS STEEL PRESSURE VESSELS AND EQUIPMENT

1. SCOPE

1.1 This standard specifies the requirements for welded flanges with hub for stainless steel pressure vessels and equipment used in chemical industry.

2. DIMENSIONS

2.1 The dimensions for welded shell flanges with hub, the diameter and number of bolts, and weight shall be as given in Table 1.

3. MATERIAL

3.1 Flange — The material for welded flanges except for the stainless steel hubs and backing plate shall conform to the requirements specified in IS : 4864-1968.

3.1.1 The stainless steel hubs and backing plate shall be of the same material as of the shell unless otherwise agreed to between the supplier and the purchaser.

3.2 Bolts and Nuts — Bolts and nuts shall conform to the requirements specified in IS : 4864-1968.

3.3 Gaskets — Gaskets of type **FB** for flange form **W** and type **FS** for flanges form **M/F** and **T/G** conforming to the requirements specified in IS : 4870-1968 shall be used.

4. DESIGNATION

4.1 Welded flanges with hub shall be designated by machining condition and groove form in which supplied, nominal diameter (d_1), flange thickness (h_1) and the number of this standard.

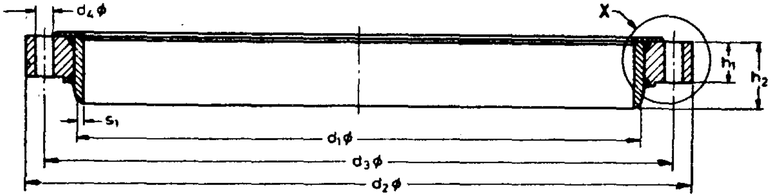
Example:

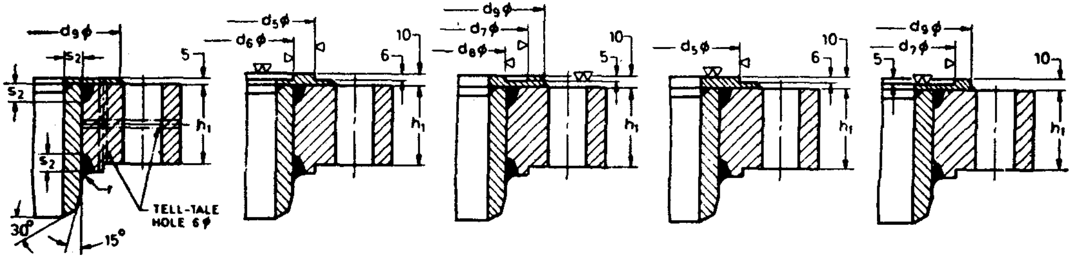
> A welded flange with hub supplied in machining condition **B** with groove form **F** having a nominal diameter d_1 = 1 000 and flange thickness h_1 = 65 shall be designated as:
>
> Welded Flange with Hub **BF** 1 000 × 65 IS : 4869-1968.

TABLE 1 DIMENSIONS FOR WELDED SHELL FLANGES WITH HUB

(*Clause* 2.1)

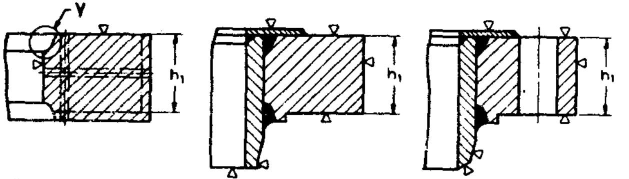
All dimensions in millimetres.





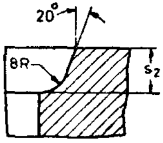
FORM W FORM T FORM G FORM M FORM F

DETAILS AT X



*A UNMACHINED †B MACHINED C MACHINED AND DRILLED

MACHINING CONDITIONS



DETAIL AT Y

*The machining allowance shall be so selected that the finished profile may be achieved without difficulty. In the absence of agreement between the purchaser and the supplier regarding the machining allowance, the values given in the form should be used. For flange form **T**, the height of the tongue or for form **M** the height of male part should be taken into account for backing plate.

When the welding flanges are ordered according to machining condition **A** together with the corresponding backing plate and hub, this should be indicated with the order.

†Before welding the backing plate on to the flange, the flange surface shall be machined.

NOMINAL DIAMETER d_1	FLANGES								BOLTS			GROOVE FORM				WEIGHT OF A SINGLE FLANGE kg APPROX	MAXIMUM ALLOWABLE PRESSURE IN kgf/cm² AT THE MAXIMUM WORKING TEMPERATURE °C				
												T & M		G & F							
	h_1	d_2	d_3	d_9 Approx	h_2	s_1‡	s_2	r	Number	Thread Nominal Dia	d_4	d_5	d_6	d_7	d_8		20	120	200	250	300
1 000	50	1 130	1 080	1 045	82	6	01	8	40	M 24	26	1 032	1 000	1 034	998	95	10	9	8	7	6
	65	1 150	1 095	1 060	105	8	14	9		M 27	30	1 032	1 000	1 034	998	148	16	14	13	11	9
	70	1 170	1 105	1 065	118	10	16	10		M 30	33	1 036	1 000	1 038	998	179	20	18	16	14	12
1 100	50	1 230	1 180	1 145	82	6	12	8	44	M 24	26	1 132	1 100	1 134	1 098	104	10	9	8	7	6
	65	1 250	1 195	1 160	105	8	14	9		M 27	30	1 132	1 100	1 134	1 098	156	13	11	10	9	8
	70	1 270	1 205	1 165	118	10	16	10		M 30	33	1 136	1 100	1 138	1 098	195	16	14	13	11	9
1 200	55	1 330	1 280	1 245	82	6	10	8	48	M 24	26	1 232	1 200	1 234	1 198	122	8	7·2	6·4	5·6	4·8
	65	1 350	1 295	1 260	105	8	16	10		M 27	30	1 232	1 200	1 234	1 198	171	13	11	10	9	8
	75	1 370	1 305	1 265	118	10	16	10		M 30	33	1 236	1 200	1 238	1 198	223	16	14	13	11	9
(1 300)	55	1 435	1 385	1 350	92	6	12	9	52	M 24	26	1 332	1 300	1 334	1 298	137	8	7·2	6·4	5·6	4·8
	70	1 450	1 395	1 360	105	8	16	10		M 27	30	1 332	1 300	1 334	1 298	194	13	11	10	9	8
	75	1 470	1 405	1 365	118	10	16	10		M 30	33	1 336	1 300	1 338	1 298	239	16	14	13	11	9

NOTE — Sizes shown in parentheses are of second preference.

‡The dimension s_1 of the welding neck generally corresponds with the thickness of shell. The dimension indicated is for guidance. When s_1 is required to be larger the inside diameter will become less and this shall be agreed upon between the purchaser and the supplier.

(*Continued*)

TABLE 1 DIMENSIONS FOR WELDED SHELL FLANGES WITH HUB — *Contd*

All dimensions in millimetres.

NOMINAL DIAMETER d_1	FLANGES								BOLTS			GROOVE FORM				WEIGHT OF A SINGLE FLANGE kg APPROX	MAXIMUM ALLOWABLE PRESSURE IN kgf/cm² AT THE MAXIMUM WORKING TEMPERATURE °C				
	h_1	d_2	d_3	d_9 Approx	h_2	s_1‡	s_2	r	Number	Thread Nominal Dia	d_4	T & M		G & F			20	120	200	250	300
												d_5	d_6	d_7	d_8						
1 400	35	1 515	1 470	1 440	67	6	10	8	56	M 20	22	1 426	1 400	1 428	1 398	83	4	3·6	3·2	2·8	2·4
	60	1 535	1 485	1 450	92	6	12	9		M 24	26	1 432	1 400	1 434	1 398	161	8	7·2	6·4	5·6	4·8
	70	1 550	1 495	1 460	105	8	14	10		M 27	30	1 432	1 400	1 434	1 398	210	10	9	8	7	6
	75	1 570	1 505	1 465	118	10	18	10		M 30	33	1 436	1 400	1 438	1 398	257	13	11	10	9	8
(1 500)	40	1 615	1 570	1 540	67	6	10	8	60	M 20	22	1 526	1 500	1 528	1 498	103	4	3·6	3·2	2·8	2·4
	60	1 635	1 585	1 550	92	6	12	9		M 24	26	1 532	1 500	1 534	1 498	172	6	5·4	5	4·2	3·6
	70	1 655	1 600	1 565	115	8	16	10		M 27	30	1 532	1 500	1 534	1 498	238	10	9	8	7	6
	80	1 675	1 610	1 570	128	11	20	11		M 30	33	1 536	1 500	1 538	1 498	310	13	11	10	9	8
1 600	45	1 715	1 670	1 640	67	6	10	8	64	M 20	22	1 626	1 600	1 628	1 598	120	4	3·6	3·2	2·8	2·4
	60	1 735	1 685	1 650	92	6	12	9		M 24	26	1 632	1 600	1 634	1 598	184	6	5·4	5	4·2	3·6
	75	1 755	1 700	1 665	115	8	16	10		M 27	30	1 632	1 600	1 634	1 598	272	10	9	8	7	6
	80	1 775	1 710	1 670	128	11	20	11		M 30	33	1 636	1 600	1 638	1 598	332	13	11	10	9	8
(1 700)	45	1 815	1 770	1 740	72	6	10	8	68	M 20	22	1 726	1 700	1 728	1 698	128	4	3·6	3·2	2·8	2·4
	60	1 835	1 785	1 755	92	6	12	9		M 24	26	1 732	1 700	1 734	1 698	194	6	5·4	5	4·2	3·6
	75	1 855	1 800	1 765	115	8	16	10		M 27	30	1 732	1 700	1 734	1 698	283	8	7·2	6·4	5·6	4·8
	80	1 875	1 810	1 770	128	11	20	11		M 30	33	1 736	1 700	1 738	1 698	351	13	11	10	9	8
1 800	45	1 915	1 870	1 840	72	6	10	8	72	M 20	22	1 826	1 800	1 828	1 798	136	3	2·7	2·4	2·1	1·8
	65	1 940	1 890	1 855	102	6	12	9		M 24	26	1 832	1 800	1 834	1 798	230	6	5·4	5	4·2	3·6
	75	1 955	1 900	1 865	115	8	16	10		M 27	30	1 832	1 800	1 834	1 798	300	8	7·2	6·4	5·6	4·8
	80	1 975	1 910	1 870	128	11	20	11		M 30	33	1 836	1 800	1 838	1 798	368	10	9	8	7	6

(1 900)	45	2 015	1 970	1 940	72	6	10	8	76	M 20	22	1 926	1 900	1 928	1 898	142	3	2·7	2·4	2·1	1·8
	65	2 040	1 990	1 955	102	6	12	9		M 24	26	1 932	1 900	1 934	1 898	242	5	4·5	4	3·5	3
	80	2 060	2 005	1 970	125	8	16	10		M 27	30	1 932	1 900	1 934	1 898	349	8	7·2	6·4	5·6	4·8
	85	2 080	2 015	1 975	138	11	20	12		M 30	33	1 936	1 900	1 938	1 898	433	10	9	8	7	6
2 000	45	2 115	2 070	2 040	72	6	10	8	80	M 20	22	2 026	2 000	2 028	1 998	149	3	2·7	2·4	2·1	1·8
	65	2 140	2 090	2 055	102	6	12	9		M 24	26	2 032	2 000	2 034	1 998	255	5	4·5	4	3·5	3
	85	2 160	2 105	2 070	125	8	16	10		M 27	30	2 032	2 000	2 034	1 998	382	8	7·2	6·4	5·6	4·8
	95	2 180	2 115	2 075	138	11	20	12		M 30	33	2 036	2 000	2 038	1 998	493	10	9	8	7	6
(2 100)	50	2 215	2 170	2 140	72	6	10	8	84	M 20	22	2 126	2 100	2 128	2 098	171	3	2·7	2·4	2·1	1·8
	65	2 240	2 190	2 155	102	6	12	9		M 24	26	2 132	2 100	2 134	2 098	267	5	4·5	4	3·5	3
	85	2 260	2 205	2 170	125	8	16	10		M 27	30	2 132	2 100	2 134	2 098	400	8	7·2	6·4	5·6	4·8
	100	2 285	2 220	2 180	148	11	20	12		M 30	33	2 136	2 100	2 138	2 098	560	10	9	8	7	6
2 200	50	2 315	2 270	2 240	72	6	10	8	88	M 20	22	2 226	2 200	2 228	2 198	180	3	2·7	2·4	2·1	1·8
	65	2 340	2 290	2 255	102	6	12	9		M 24	26	2 232	2 200	2 234	2 198	280	5	4·5	4	3·5	3
	85	2 360	2 305	2 270	125	8	16	10		M 27	30	2 232	2 200	2 234	2 198	420	6	5·4	5	4·2	3·6
	100	2 385	2 320	2 280	148	11	20	12		M 30	33	2 236	2 200	2 238	2 198	588	10	9	8	7	6
(2 300)	50	2 415	2 370	2 340	72	6	10	8	92	M 20	22	2 326	2 300	2 328	2 298	187	2	1·8	1·6	1·4	1·2
	65	2 440	2 390	2 355	102	6	12	9		M 24	26	2 332	2 300	2 334	2 298	293	5	4·5	4	3·5	3
	85	2 460	2 405	2 370	125	9	16	10		M 27	30	2 332	2 300	2 334	2 298	443	6	5·4	5	4·2	3·6
	100	2 485	2 420	2 380	148	11	20	12		M 30	33	2 336	2 300	2 338	2 298	610	8	7·2	6·4	5·6	4·8
2 400	50	2 520	2 475	2 445	82	6	10	8	96	M 20	22	2 426	2 400	2 428	2 398	209	2	1·8	1·6	1·4	1·2
	70	2 540	2 490	2 455	102	6	12	9		M 24	26	2 432	2 400	2 434	2 398	322	4	3·6	3	2·5	2
	85	2 565	2 510	2 475	135	9	16	10		M 27	30	2 432	2 400	2 434	2 398	480	6	5·4	5	4·2	3·6
	100	2 585	2 520	2 480	148	11	20	12		M 30	33	2 436	2 400	2 438	2 398	634	8	7·2	6·4	5·6	4·8
2 600	50	2 720	2 675	2 645	82	6	10	8	104	M 20	22	2 626	2 600	2 628	2 598	225	2	1·8	1·6	1·4	1·2
	75	2 745	2 695	2 660	112	7	14	10		M 24	26	2 632	2 600	2 634	2 598	396	4	3·6	3·2	2·8	2·4
	90	2 765	2 710	2 675	135	10	18	11		M 27	30	2 632	2 600	2 634	2 598	556	6	5·4	5	4·2	3·6
	110	2 785	2 720	2 680	168	11	20	12		M 30	33	2 636	2 600	2 638	2 598	742	8	7·2	6·4	5·6	4·8

NOTE — Sizes shown in parentheses are of second preference.

‡The dimension s_1 of the welding neck generally corresponds with the thickness of shell. The dimension indicated is for guidance. When s_1 is required to be larger the inside diameter will become less and this shall be agreed upon between the purchaser and the supplier.

(Continued)

TABLE 1 DIMENSIONS FOR WELDED SHELL FLANGES WITH HUB — *Contd*

All dimensions in millimetres.

NOMINAL DIAMETER d_1	FLANGES								BOLTS			GROOVE FORM				WEIGHT OF A SINGLE FLANGE kg APPROX	MAXIMUM ALLOWABLE PRESSURE IN kgf/cm^2 AT THE MAXIMUM WORKING TEMPERATURE °C				
	h_1	d_2	d_3	d_9 Approx	h_2	s_1‡	s_2	r	Number	Thread Nominal Dia	d_4	T & M		G & F							
												d_5	d_6	d_7	d_8		20	120	200	250	300
2 800	55	2 920	2 875	2 845	82	6	10	8	112	M 20	22	2 826	2 800	2 828	2 798	260	2	1·8	1·6	1·4	1·2
	80	2 950	2 900	2 865	122	7	14	10		M 24	26	2 832	2 800	2 834	2 798	469	4	3·6	3·2	2·8	2·4
	90	2 965	2 910	2 875	135	10	18	11		M 27	30	2 832	2 800	2 834	2 798	599	5	4·5	4	3·5	3
	120	2 985	2 920	2 880	168	11	20	12		M 30	33	2 836	2 800	2 838	2 798	873	8	7·2	6·4	5·6	4·8
3 000	55	3 120	3 075	3 045	82	7	10	8	120	M 20	22	3 026	3 000	3 028	2 998	281	2	1·8	1·6	1·4	1·2
	80	3 150	3 100	3 065	122	7	14	10		M 24	26	3 032	3 000	3 034	2 998	502	3	2·7	2·4	2·1	1·8
	95	3 170	3 115	3 080	145	10	18	11		M 27	30	3 032	3 000	3 034	2 998	694	5	4·5	4	3·5	3
	120	3 185	3 120	3 080	163	12	24	12		M 30	33	3 036	3 000	3 038	2 998	936	8	7·2	6·4	5·6	4·8
3 200	60	3 320	3 275	3 245	82	8	10	8	128	M 20	22	3 226	3 200	3 228	3 198	323	2	1·8	1·6	1·4	1·2
	80	3 350	3 300	3 265	122	8	14	10		M 24	26	3 232	3 200	3 234	3 198	542	3	2·7	2·4	2·1	1·8
	105	3 370	3 315	3 280	155	10	18	11		M 27	30	3 232	3 200	3 234	3 198	812	5	4·5	4	3·5	3
	120	3 385	3 320	3 280	168	12	20	12		M 30	33	3 236	3 200	3 238	3 198	998	6	5·4	5	4·2	3·6

NOTE — Sizes shown in parentheses are of second preference.

‡The dimension s_1 of the welding neck generally corresponds with the thickness of shell. The dimension indicated is for guidance. When s_1 is required to be larger the inside diameter will become less and this shall be agreed upon between the purchaser and the supplier.

Indian Standard

SPECIFICATION FOR SHELL FLANGES FOR VESSELS AND EQUIPMENT : FLAT GASKETS FOR SHELL FLANGES

1. SCOPE

1.1 This standard specifies the requirements for flat gasket rings for shell flanges for chemical equipment as the function of flange inner diameter and the size of the bolts.

2. DIMENSIONS

2.1 The dimensions for flat gasket for flanges shall be as given in Table 1.

3. MATERIAL

3.1 The gasket shall be of rubber, asbestos, compressed asbestos jointing metal or metal jacketed of quality suitable for the temperature of use.

4. DESIGNATION

4.1 The gasket rings shall be designated by the inner and outer diameter, thickness and the number of this standard.

Example:

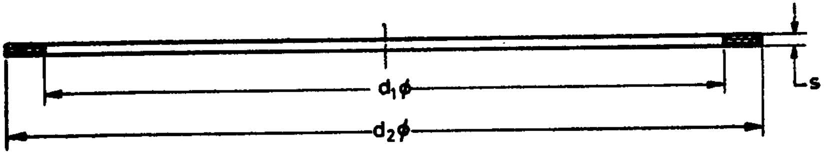
A gasket ring having an inner diameter 1 000 mm, outside diameter 1 050 mm and thickness 4 mm shall be designated as:

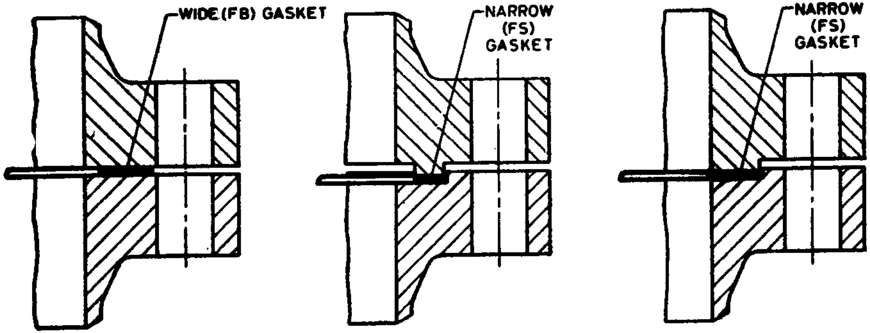
Gasket Ring 1 000 × 1 050 × 4 IS : 4870-1968

TABLE 1 DIMENSIONS FOR FLAT GASKETS FOR SHELL FLANGES

(*Clause* 2.1)

All dimensions in millimetres.





USE OF GASKET WITH DIFFERENT TYPES OF SHELL FLANGES

Thickness for Gaskets

Thickness *s*	For Gasket Width
3	Up to 20
4	Over 20 and up to 30
5	Over 30

TABLE 1 — *Contd*

NOMINAL DIAMETER d_1	TYPE FB					TYPE FS				
	d_2, For Bolts					d_2, For Bolts				
	M 16	M 20	M 24	M 27	M 30	M 16	M 20	M 24	M 27	M 30
324	354	360	364			344	344	350		
368	398	404	408			388	388	394		
419	449	455	459			439	439	445		
(457)	487	493	497			477	477	483		
508	538	544	548	558		528	528	534	540	
600	640	640	650	655	660	626	626	632	632	636
700	740	740	750	755	765	726	726	732	732	736
800	840	840	850	855	865	826	826	832	832	836
900	940	940	950	955	965		926	932	932	936
1 000	1 040	1 040	1 050	1 060	1 065		1 026	1 032	1 032	1 036
1 100	1 140	1 140	1 150	1 160	1 165		1 126	1 132	1 132	1 136
1 200	1 250	1 240	1 250	1 260	1 265		1 226	1 232	1 232	1 236
(1 300)	1 350	1 340	1 350	1 360	1 365		1 326	1 332	1 332	1 336
1 400	1 450	1 440	1 450	1 460	1 465		1 426	1 432	1 432	1 436
(1 500)	1 550	1 540	1 550	1 565	1 570		1 526	1 532	1 532	1 536
1 600	1 650	1 640	1 650	1 665	1 670		1 626	1 632	1 632	1 636
(1 700)	1 750	1 740	1 750	1 765	1 770		1 726	1 732	1 732	1 736
1 800		1 840	1 855	1 865	1 870		1 826	1 832	1 832	1 836
(1 900)		1 940	1 955	1 970	1 975		1 926	1 932	1 932	1 936
2 000		2 040	2 055	2 070	2 075		2 026	2 032	2 032	2 036
(2 100)		2 140	2 155	2 170	2 180		2 126	2 132	2 132	2 136
2 200		2 240	2 255	2 270	2 280		2 226	2 232	2 232	2 236
(2 300)		2 340	2 355	2 370	2 380		2 326	2 332	2 332	2 336
2 400		2 445	2 455	2 475	2 480		2 426	2 432	2 432	2 436
2 600		2 645	2 660	2 675	2 680		2 626	2 632	2 632	2 636
2 800		2 845	2 865	2 875	2 880		2 826	2 832	2 832	2 836
3 000		3 045	3 065	3 080	3 080		3 026	3 032	3 032	3 036
3 200		3 245	3 265	3 280	3 280		3 226	3 232	3 232	3 236

NOTE — Sizes shown in parentheses are of second preference.

(*Continued from page* 1)

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(*Continued on page* 41)

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